

SWEETWATER UNION HIGH SCHOOL DISTRICT  
DIVISION OF ADULT EDUCATION  
Career Technical Education

**A+ COMPUTER REPAIR: Essential & Practical Application**

**COURSE APPROVAL**

**Mission:** The Division of Adult Education, a community-focused organization, promotes and facilitates life-long learning for adults to meet the challenges of the 21<sup>st</sup> century.

**Student Learning Outcomes**

- Students will establish personal, academic and/or workforce goals and demonstrate progress toward them
- Students will solve problems
- Students will communicate clearly and collaborate with others
- Students will use resources, including technology, to research, organize and communicate information

**Course approved by the Board of Trustees:**

**May 20, 2008**

**Revised**

May 11, 2008

May 11, 2009

July 27, 2010

July 23, 2012

May 12, 2014

June 27, 2016

## A+ Computer Repair: Essential & Practical Application

### Basic Course Information

<b>Course Title:</b>	<b>A+ COMPUTER REPAIR: Essential &amp; Practical Application</b>
<b>CTE Industry Sector:</b>	<b>Information and Communication Technologies</b>
<b>Career Pathway:</b>	<b>Information Support and Services</b>

<b>Course Level:</b>	X	Introductory		Concentration		Capstone
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<b>Course Number:</b>	<b>0614</b>
<b>CBEDS Title:</b>	<b>Computer Repair and Support</b>
<b>CBEDS Number:</b>	<b>4633</b>

<b>Course Hours:</b>	<b>440</b>
<b>Articulation Information:</b>	<b>Southwestern College Microcomputer Repair ELEC 10A Microcomputer Hardware/Software Upgrade ELEC10B Microcomputer Systems &amp; A+ Certification ELEC 260</b>
<b>Academic Credit:</b>	<b>ELEC 10A – 2 credits ELEC 10B – 2 credits ELEC 260 – 4 credits</b>
<b>Advisory Committee Meetings:</b>	<b>Annually</b>

### Course Description

This introductory course is designed to help students prepare for entry-level positions in the ICT field. Job titles include enterprise technician, IT administrator, and field service technician, call center technician, help desk technician, and PC or support technician.

In addition, the curriculum helps students gain confidence with the components of desktop and laptop computers by teaching the proper procedures for hardware and software installations, upgrades, and troubleshooting.

### Instructional Strategies: Essentials

Instructional time will be apportioned approximately as follows:	
Teacher lecture and demonstration .....	30%
Class discussions .....	10%
Student practice .....	40%
Cooperative learning groups.....	5%
Computer assisted learning.....	5%
Field trips .....	5%
Assessment and evaluation of student progress .....	5%

## Instructional Materials

CISCO Course Booklet / Lab Manual, one lab PC per student, one lab PC for two students for the hands-on lab activities. Connectivity to a local network and the internet.

The student lab PCs will be in various states of assembly and repair during the course and therefore are not suitable for viewing the curriculum content

## Course Sequence

Sequence of Courses	Course Level			Primary Funding Source		Perkins Funded	Total Duration
	Intro	Concentration	Capstone	District/COE	ROCP	Yes or No	(In hours)
A+ Computer Repair: Essentials	X	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Yes	440
A+ Computer Repair: DL	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Yes	202

## Occupations for Identified Pathway

Pathway occupations organized by level of education and training required for workplace entry. (Asterisked occupations require certification or licensure.)	
Postsecondary Training (certification and/or AA degree)	College University (bachelor's degree or higher)
<ul style="list-style-type: none"> <li>• CompTIA A+ Computer Repair*</li> <li>• CompTIA Certified Professional*</li> <li>• Cisco Certified Network Technician* (CCNT)</li> <li>• Cisco Certified Network Associate* (CCNA)</li> </ul>	<ul style="list-style-type: none"> <li>• Telecommunications Engineer</li> <li>• Computer Engineer</li> <li>• Network Engineer</li> <li>• Electrical Engineer</li> </ul>

## Course Goals: Essentials

1. Understanding the Personal Computer
2. Safe Lab Procedures and Tool Use
3. Computer Assembly – Step by Step
4. Basics of Preventive Maintenance and Troubleshooting
5. Fundamentals of Operating Systems
6. Fundamentals of Laptops and Portable Devices
7. Fundamentals of Printers and Scanners
8. Fundamentals of Networks
9. Fundamentals of Security
10. Effective Communication Skills
11. Advanced understanding of Personal Computers
12. Advanced Operating Systems
13. Advanced Laptops and Portable Devices
14. Advanced Printers and Scanners
15. Advanced Networks
16. Advanced Security

## Instructional Module/Unit Networking for Home and Small Businesses

<b>Unit 1</b>	<b>Explain IT industry certifications</b>	<b>Theory Hrs.</b>	<b>5</b>	<b>Lab Hrs.</b>	<b>5</b>
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### Description:

#### 1.0 Unit Introduction

##### 1.1 Describe a computer system

##### 1.2 Identify the names, purposes, and characteristics of cases and power supplies

##### 1.3 Identify the names, purposes, and characteristics of internal components

##### 1.4 Identify the names, purposes, and characteristics of ports and cables

##### 1.5 Identify the names, purposes, and characteristics of input devices

##### 1.6 Identify the names, purposes, and characteristics of output devices

##### 1.7 Explain system resources and their purposes

##### 1.8 Unit Summary

Anchor Standards:	Pathway Standards:	Academic Standards:
2.1-2.4, 2.7, 4.1-4.3, 5.4, 5.6, 5.10, 6.8-6.11, 7.4, 10.1-10.3, 10.5, 10.9, 10.11, 10.14, 11.1, 11.2	A2.0-A2.4, A3.1, A4.1, A5.1, A6.0, A6.1, A6.2, A6.4	LS 11-12.1-12.5, RSIT 11-12.2, 11-12.3, 11-12.7, WS 11-12.4-12.9, F-IF 1-2, 4-6, G-MG 1-3, N-Q 1-3, S-IC 1, 3, 5, 6, S-MD 1-7, APPS 10-16, LSI A, B, LS 4B, AD12.8, 12.82, 12.83, WH 10.35-10.9, 10.11

<b>Unit 2</b>	<b>Explain the purpose of safe working conditions and procedures</b>	<b>Theory Hrs.</b>	<b>5</b>	<b>Lab Hrs.</b>	<b>5</b>
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### Description:

#### 2.0 Unit Introduction

##### 2.1 Explain the purpose of safe working conditions and procedures

##### 2.2 Identify tools and software used with personal computer components and their purposes

##### 2.3 Implement proper tool use

##### 2.4 Unit Summary

Anchor Standards:	Pathway Standards:	Academic Standards:
2.2-2.4, 2.6, 2.8, 3.2, 4.2, 4.3, 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 6.1-6.11, 11.1	A1.1, A6.3, A7.5	LS 11-12.1-12.6, RSIT 11-12.1-11-12.7, WS 11-12.5-12.9, S-IC 1, 3, 5, 6, S-MD 1-7, APPS 10, 15, 16, AD 12.7, 12.7.5., 12.8.2., 12.8.3., US 11.8, 11.8.7., WH 10.3, 10.3.5., 10.9, 10.11

<b>Unit 3</b>	<b>Open the case</b>	<b>Theory Hrs.</b>	<b>10</b>	<b>Lab Hrs.</b>	<b>10</b>
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### Description:

#### 3.0 Unit Introduction

##### 3.1 Install the power supply

##### 3.2 Attach the components to the motherboard and install the motherboard

##### 3.3 Install internal drives

##### 3.4 Install drives in external bays

##### 3.5 Install adapter cards

## A+ Computer Repair

- 3.6 Connect all internal cables
- 3.7 Connect all internal cables
- 3.9 Boot the computer for the first time
- 3.10 Unit Summary

Anchor Standards:	Pathway Standards:	Academic Standards:
2.1-2.3, 2.5, 2.7, 4.1-4.3, 5.1-5.6, 6.6, 7.4, 8.1, 9.3, 10.1-10.14, 11.1-11.3	A1.0, A2.0-2.4, A3.1, 3.3, A4.0-4.4, A5.4, A6.1-6.4, A8.1-8.3	LS 11-12.1-12.6, RSIT 11.12.1, 12.2, 12.3, 12.7, WS 11-12.3, 12.9, A-CEO 1, 2, 3,4, A-REI 1, 2, F-IF 1-10, F-LE 5, G-MG 1, 3, N-RN 1, 2, N-Q 1-3, N-VM 6-12, s-IC 1-3, 5-6, S-ID 1-6, S-MD 1-7, APPS 10-16, LS1.A, LS1.B, LS4.B, US 11.8, 11.8.7., WH 10.3, 10.3.5, 10.9, 10.11

Unit 4	Explain the purpose of preventive maintenance	Theory Hrs.	5	Lab Hrs.	5
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**Description:**

- 4.0 Unit Introduction
- 4.1 Identify the steps of troubleshooting process
- 4.2 Unit Summary

Anchor Standards:	Pathway Standards:	Academic Standards:
2.1-2.4, 2.7, 4.1-4.3, 5.4, 5.6, 5.10, 6.8-6.11, 7.4, 10.1-10.3, 10.5, 10.9, 10.11, 10.14, 11.1, 11.2	A2.0-A2.4, A3.1, A4.1, A5.1, A6.0, A6.1, A6.2, A6.4	LS 11-12.1-12.5, RSIT 11-12.2, 11-12.3, 11-12.7, WS 11-12.4-12.9, F-IF 1-2, 4-6, G-MG 1-3, N-Q 1-3, S-IC 1, 3, 5, 6, S-MD 1-7, APPS 10-16, LSI A, B, LS 4B, AD12.8, 12.82, 12.83, WH 10.35-10.9, 10.11

Unit 5	Explain the purpose of an operation system	Theory Hrs.	5	Lab Hrs.	10
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**Description:**

- 5.0 Unit Introduction
- 5.1 Determine operating system based on customer needs
- 5.2 Install an operating system
- 5.3 Navigate a GUI (Windows)
- 5.6 Identify and apply common preventive maintenance techniques for operating systems
- 5.7 Troubleshoot operating systems
- 5.8 Unit Summary

Anchor Standards:	Pathway Standards:	Academic Standards:
2.1-2.4, 2.7, 4.1-4.6, 5.1-5.4, 5.5, 5.6, 6.3, 6.4-6.10, 7.4, 7.7, 8.1, 9.1-9.3, 9.6, 10.1-10.3, 10.5, 10.6, 10.8, 10.9, 10.10, 10.11-10.14, 11.1-11.2	A1.1-1.2, A2.1-2.4, A3.1, A3.3, A3.6, A4.1-4.4, A6.1-A6.7, A7.3, A8.3, A8.5	LS 11-12.1-12.6, RSIT 11-12.1-12.3, RSIT 11-12.7, WS 11-12.1-12.9, A-CED 1-4, A-REI 1, 2, F-IF 1-10, G-MG 1, 3, N-RN 1, 2, N-Q 1-3, N-VM 6-12, S-IC 1-2, 3, 5, 6, S-ID 1-6, S-MD 1-7, APPS 10-16, LSI.A, LSI.B, LS4.B, AD 12.7-12.8.3, US 11.8-11.8.7, WH 10.3-

		10.3.5, 10.9, 10.11
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<b>Unit 6</b>	<b>Describe laptops and other portable devices</b>	<b>Theory Hrs.</b>	<b>10</b>	<b>Lab Hrs.</b>	<b>10</b>
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**Description:**

6.0 Unit Introduction

6.1 Identify and describe the components of a laptop

6.2 Compare and contrast desktop and laptop components

6.3 Explain how to configure laptops

6.4 Compare the different mobile phone standards

6.5 Identify common preventive maintenance techniques for laptops and portable devices

6.6 Describe how to troubleshoot laptops and portable devices

6.7 Unit Summary

Anchor Standards:	Pathway Standards:	Academic Standards:
2.1-2.4, 2.7, 3.1-3.3, 4.1-4.6, 5.1-5.4, 5.5, 5.6, 6.3, 6.4-6.10, 7.4, 7.7, 8.1, 8.2, 8.3, 9.1-9.3, 9.6, 10.1-10.3, 10.5, 10.6, 10.8, 10.9, 10.10, 10.11-10.14, 11.1-11.2	A1.1-1.2, A2.1-2.4, A3.1, A3.2, A3.3-3.5, A3.6, A4.1-4.4, A6.1-A6.7, A7.3, A8.3, A8.5	LS 11-12.1-12.6, RSIT 11-12.1-12.3, RSIT 11-12.7, WS 11-12.1-12.9, A-CED 1-4, A-REI 1, 2, F-IF 1-10, G-MG 1, 3, N-RN 1, 2, N-Q 1-3, N-VM 6-12, S-IC 1-2, 3, 5, 6, S-ID 1-6, S-MD 1-7, APPS 10-16, LSI.A, LSI.B, LS4.B, AD 12.7-12.8.3, US 11.8-11.8.7, WH 10.3-10.3.5, 10.9, 10.11

<b>Unit 7</b>	<b>Describe the types of printers currently available</b>	<b>Theory Hrs.</b>	<b>10</b>	<b>Lab Hrs.</b>	<b>5</b>
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**Description:**

7.0 Unit Summary

7.1 Describe the installation and configuration and process for printers

7.2 Describe the types of scanners currently available

7.3 Describe the installation and configuration process for scanners

7.4 Identify and apply common preventive maintenance techniques for printers and scanners

7.5 Troubleshoot printers and scanners

7.6 Unit Summary

Anchor Standards:	Pathway Standards:	Academic Standards:
2.1-2.4, 2.7, 4.1-4.3, 5.4, 5.6, 5.10, 6.8-6.11, 7.4, 10.1-10.3, 10.5, 10.9, 10.11, 10.14, 11.1, 11.2	A2.0-A2.4, A3.1, A4.1, A5.1, A6.0, A6.1, A6.2, A6.4	LS 11-12.1-12.5, RSIT 11-12.2, 11-12.3, 11-12.7, WS 11-12.4-12.9, F-IF 1-2, 4-6, G-MG 1-3, N-Q 1-3, S-IC 1, 3, 5, 6, S-MD 1-7, APPS 10-16, LSI A, B, LS 4B, AD12.8, 12.82, 12.83, WH 10.35-10.9, 10.11

<b>Unit 8</b>	<b>Explain the principles of networking</b>	<b>Theory Hrs.</b>	<b>15</b>	<b>Lab Hrs.</b>	<b>20</b>
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**Description:**

- 8.0 Unit Introduction
- 8.1 Describe types of networks
- 8.2 Describe basic networking concepts and technologies
- 8.3 Describe the physical components of a network
- 8.4 Describe LAN topologies and architectures
- 8.5 Identify standards organizations
- 8.6 Identify Ethernet standards
- 8.7 Explain OSI and TCP/IP data models
- 8.8 Describe how to configure a NIC and a modem
- 8.9 Identify names, purposes, and characteristics of other technologies used to establish connectivity
- 8.10 Identify and apply common preventive maintenance techniques used for networks
- 8.11 Troubleshoot a network
- 8.12 Unit Summary

Anchor Standards:	Pathway Standards:	Academic Standards:
2.1-2.4, 2.7, 4.1-4.3, 5.4, 5.6, 5.10, 6.8-6.11, 7.4, 10.1-10.3, 10.5, 10.9, 10.11, 10.14, 11.1, 11.2	A2.0-A2.4, A3.1, A4.1, A5.1, A6.0, A6.1, A6.2, A6.4	LS 11-12.1-12.5, RSIT 11-12.2, 11-12.3, 11-12.7, WS 11-12.4-12.9, F-IF 1-2, 4-6, G-MG 1-3, N-Q 1-3, S-IC 1, 3, 5, 6, S-MD 1-7, APPS 10-16, LSI A, B, LS 4B, AD12.8, 12.82, 12.83, WH 10.35-10.9, 10.11

<b>Unit 9</b>	<b>Explain why security is Important</b>	<b>Theory Hrs.</b>	<b>5</b>	<b>Lab Hrs.</b>	<b>5</b>
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**Description:**

- 9.0 Unit Introduction
- 9.1 Describe security threats
- 9.2 Identify security procedures
- 9.3 Identify common preventive Maintenance techniques for security
- 9.4 Troubleshoot security
- 9.5 Unit Summary

Anchor Standards:	Pathway Standards:	Academic Standards:
2.1-2.4, 2.7, 4.1-4.3, 5.4, 5.6, 5.10, 6.8-6.11, 7.4, 10.1-10.3, 10.5, 10.9, 10.11, 10.14, 11.1, 11.2	A2.0-A2.4, A3.1, A4.1, A5.1, A6.0, A6.1, A6.2, A6.4	LS 11-12.1-12.5, RSIT 11-12.2, 11-12.3, 11-12.7, WS 11-12.4-12.9, F-IF 1-2, 4-6, G-MG 1-3, N-Q 1-3, S-IC 1, 3, 5, 6, S-MD 1-7, APPS 10-16, LSI A, B, LS 4B, AD12.8, 12.82, 12.83, WH 10.35-10.9, 10.11

<b>Unit 10</b>	<b>Explain the relationship between communication and troubleshooting</b>	<b>Theory Hrs.</b>	<b>5</b>	<b>Lab Hrs.</b>	
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**Description:**

- 10.0 Unit Introduction
- 10.1 Describe good communication skills and professional behavior
- 10.2 Explain ethics and legal aspects of working with computer technology
- 10.3 Describe call center environment and technician responsibilities
- 10.4 Unit Summary

Anchor Standards:	Pathway Standards:	Academic Standards:
2.1-2.4, 2.7, 4.1-4.3, 5.1, 5.2, 5.3, 5.4, 5.6, 5.10, 6.8-6.11, 7.4, 9.1, 9.2, 9.3, 10.1-10.3, 10.5, 10.9, 10.11, 10.14, 11.1, 11.2	A2.0-A2.4, A3.1, A4.1, A5.1, A6.0, A6.1, A6.2, A6.4, A8.1-8.3	LS 11-12.1-12.5, RSIT 11-12.2, 11-12.3, 11-12.7, WS 11-12.4-12.9, F-IF 1-2, 4-6, G-MG 1-3, N-Q 1-3, S-IC 1, 3, 5, 6, S-MD 1-7, APPS 10-16, LSI A, B, LS 4B, AD12.8, 12.82, 12.83, WH 10.35-10.9, 10.11

Unit 11	Give an overview of field, remote, and bench technician jobs	Theory Hrs.	5	Lab Hrs.	5
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**Description:**

11.0 Unit Introduction

11.1 Explain safe lab procedures and tool use

11.2 Describe situations requiring replacement of computer components

11.3 Upgrade and configure personal computer components and peripherals

11.4 Identify and apply common preventive maintenance techniques for personal computer components

11.5 Troubleshoot computer components and peripherals

11.6 Unit Summary

Anchor Standards:	Pathway Standards:	Academic Standards:
2.1-2.4, 2.7, 4.1-4.6, 5.1-5.4, 5.5, 5.6, 6.3, 6.4-6.10, 7.4, 7.7, 8.1, 9.1-9.3, 9.6, 10.1-10.3, 10.5, 10.6, 10.8, 10.9, 10.10, 10.11-10.14, 11.1-11.2	A1.1-1.2, A2.1-2.4, A3.1, A3.3, A3.6, A4.1-4.4, A6.1-A6.7, A7.3, A8.3, A8.5	LS 11-12.1-12.6, RSIT 11-12.1-12.3, RSIT 11-12.7, WS 11-12.1-12.9, A-CED 1-4, A-REI 1, 2, F-IF 1-10, G-MG 1, 3, N-RN 1, 2, N-Q 1-3, N-VM 6-12, S-IC 1-2, 3, 5, 6, S-ID 1-6, S-MD 1-7, APPS 10-16, LSI.A, LSI.B, LS4.B, AD 12.7-12.8.3, US 11.8-11.8.7, WH 10.3-10.3.5, 10.9, 10.11

Unit 12	Select the appropriate operating system based on customer needs	Theory Hrs.	5	Lab Hrs.	5
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**Description:**

12.0 Unit Introduction

12.1 Install, configure, and optimize an operating system

12.2 Describe how to upgrade the operating systems

12.3 Describe preventive maintenance procedures for operating systems

12.4 Troubleshoot operating systems

12.5 Unit Summary

Anchor Standards:	Pathway Standards:	Academic Standards:
2.1-2.4, 2.7, 4.1-4.6, 5.1-5.4, 5.5, 5.6, 6.3, 6.4-6.10, 7.4, 7.7, 8.1, 9.1-9.3, 9.6, 10.1-10.3, 10.5, 10.6, 10.8, 10.9, 10.10, 10.11-10.14, 11.1-11.2	A1.1-1.2, A2.1-2.4, A3.1, A3.3, A3.6, A4.1-4.4, A6.1-A6.7, A7.3, A8.3, A8.5	LS 11-12.1-12.6, RSIT 11-12.1-12.3, RSIT 11-12.7, WS 11-12.1-12.9, A-CED 1-4, A-REI 1, 2, F-IF 1-10, G-MG 1, 3, N-RN 1, 2, N-Q 1-3, N-VM 6-12, S-IC 1-2, 3, 5, 6, S-ID 1-6, S-MD 1-7, APPS 10-16, LSI.A, LSI.B, LS4.B, AD 12.7-12.8.3, US 11.8-11.8.7, WH 10.3-



		10.3.5, 10.9, 10.11
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<b>Unit 13</b>	<b>Describe wireless communications methods for laptops and portable devices</b>	<b>Theory Hrs.</b>	<b>5</b>	<b>Lab Hrs.</b>	<b>5</b>
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**Description:**

- 13.0 Unit Introduction
- 13.1 Describe repairs for laptops and portable devices
- 13.2 Select laptop components
- 13.3 Describe preventive maintenance procedures for laptops
- 13.4 Describe how to troubleshoot a laptop
- 12.6 Unit Summary

Anchor Standards:	Pathway Standards:	Academic Standards:
2.1-2.4, 2.7, 3.1-3.3, 4.1-4.6, 5.1-5.4, 5.5, 5.6, 6.3, 6.4-6.10, 7.4, 7.7, 8.1, 8.2, 8.3, 9.1-9.3, 9.6, 10.1-10.3, 10.5, 10.6, 10.8, 10.9, 10.10, 10.11-10.14, 11.1-11.2	A1.1-1.2, A2.1-2.4, A3.1, A3.2, A3.3-3.5, A3.6, A4.1-4.4, A6.1-A6.7, A7.3, A8.3, A8.5	LS 11-12.1-12.6, RSIT 11-12.1-12.3, RSIT 11-12.7, WS 11-12.1-12.9, A-CED 1-4, A-REI 1, 2, F-IF 1-10, G-MG 1, 3, N-RN 1, 2, N-Q 1-3, N-VM 6-12, S-IC 1-2, 3, 5, 6, S-ID 1-6, S-MD 1-7, APPS 10-16, LSI.A, LSI.B, LS4.B, AD 12.7-12.8.3, US 11.8-11.8.7, WH 10.3-10.3.5, 10.9, 10.11

<b>Unit 14</b>	<b>Describe potential safety hazards procedures associated with printers and scanners</b>	<b>Theory Hrs.</b>	<b>5</b>	<b>Lab Hrs.</b>	
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**Description:**

- 14.0 Unit Introduction
- 14.1 Install and configure a local printer and scanner
- 14.2 Describe how to share a printer and a scanner on a network
- 14.3 Upgrade and configure printers and scanners
- 14.4 Describe printer and scanner preventive maintenance techniques
- 14.5 Troubleshoot printers and scanners
- 14.6 Unit Summary

Anchor Standards:	Pathway Standards:	Academic Standards:
2.1-2.4, 2.7, 4.1-4.3, 5.4, 5.6, 5.10, 6.8-6.11, 7.4, 10.1-10.3, 10.5, 10.9, 10.11, 10.14, 11.1, 11.2	A2.0-A2.4, A3.1, A4.1, A5.1, A6.0, A6.1, A6.2, A6.4	LS 11-12.1-12.5, RSIT 11-12.2, 11-12.3, 11-12.7, WS 11-12.4-12.9, F-IF 1-2, 4-6, G-MG 1-3, N-Q 1-3, S-IC 1, 3, 5, 6, S-MD 1-7, APPS 10-16, LSI A, B, LS 4B, AD12.8, 12.82, 12.83, WH 10.35-10.9, 10.11

<b>Unit 15</b>	<b>Identify potential safety hazards and implement proper safety procedures related to networks</b>	<b>Theory Hrs.</b>	<b>5</b>	<b>Lab Hrs.</b>	
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**Description:**

- 15.0 Unit Introduction
- A+ Computer Repair

- 15.2 Design a network based on customer's needs
- 15.3 Determine the components for your customer's network
- 15.4 Implement the customer's network
- 15.5 Upgrade the customer's network
- 15.6 Describe installation, configuration, and management of a simple mail server
- 15.7 Describe preventive maintenance procedures for networks
- 15.8 Troubleshoot the network
- 15.9 Unit Summary

Anchor Standards:	Pathway Standards:	Academic Standards:
2.1-2.4, 2.7, 4.1-4.6, 5.1-5.4, 5.5, 5.6, 6.3, 6.4-6.10, 7.4, 7.7, 8.1, 9.1-9.3, 9.6, 10.1-10.3, 10.5, 10.6, 10.8, 10.9, 10.10, 10.11-10.14, 11.1-11.2	A1.1-1.2, A2.1-2.4, A3.1, A3.3, A3.6, A4.1-4.4, A6.1-A6.7, A7.3, A8.3, A8.5	LS 11-12.1-12.6, RSIT 11-12.1-12.3, RSIT 11-12.7, WS 11-12.1-12.9, A-CED 1-4, A-REI 1, 2, F-IF 1-10, G-MG 1, 3, N-RN 1, 2, N-Q 1-3, N-VM 6-12, S-IC 1-2, 3, 5, 6, S-ID 1-6, S-MD 1-7, APPS 10-16, LSI.A, LSI.B, LS4.B, AD 12.7-12.8.3, US 11.8-11.8.7, WH 10.3-10.3.5, 10.9, 10.11

Unit 16	Outline security requirements based on customer needs	Theory Hrs.	5	Lab Hrs.	5
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**Description:**

- 16.0 Unit Introduction
- 16.1 Select security components based on customer needs
- 16.2 Implement customer's security policy
- 16.3 Perform preventive maintenance on security
- 16.4 Troubleshoot security
- 16.5 Unit Summary

Anchor Standards:	Pathway Standards:	Academic Standards:
2.1-2.4, 2.7, 3.1-3.3, 4.1-4.6, 5.1-5.4, 5.5, 5.6, 6.3, 6.4-6.10, 7.4, 7.7, 8.1, 8.2, 8.3, 9.1-9.3, 9.6, 10.1-10.3, 10.5, 10.6, 10.8, 10.9, 10.10, 10.11-10.14, 11.1-11.2	A1.1-1.2, A2.1-2.4, A3.1, A3.2, A3.3-3.5, A3.6, A4.1-4.4, A6.1-A6.7, A7.3, A8.3, A8.5	LS 11-12.1-12.6, RSIT 11-12.1-12.3, RSIT 11-12.7, WS 11-12.1-12.9, A-CED 1-4, A-REI 1, 2, F-IF 1-10, G-MG 1, 3, N-RN 1, 2, N-Q 1-3, N-VM 6-12, S-IC 1-2, 3, 5, 6, S-ID 1-6, S-MD 1-7, APPS 10-16, LSI.A, LSI.B, LS4.B, AD 12.7-12.8.3, US 11.8-11.8.7, WH 10.3-10.3.5, 10.9, 10.11

Totals	Theory Hrs.	105	Lab Hrs.	95	Total Hrs.	200
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## Course Goals: Practical Application

1. Advanced Personal Computers
2. Advanced Operating Systems
3. Advanced Laptops and Portable Devices
4. Advanced Printers and Scanners
5. Advanced Networks
6. Advanced Security

## Course Objectives: Practical Application

1.	Give an overview of field, remote, and bench technician jobs
2.	Select the appropriate operating system based on customer needs
3.	Describe wireless communication methods for laptops and portable devices
4.	Describe potential safety hazards and safety procedures associated with printers and scanners
5.	Identify potential safety hazards and implement proper safety procedures related to networks
6.	Outline security requirements based on customer needs

## Instructional Strategies: Practical Application

Instructional time will be apportioned approximately as follows:	
Teacher lecture and demonstration .....	30%
Class discussions .....	10%
Student practice.....	40%
Cooperative learning groups .....	5%
Computer assisted learning.....	5%
Field trips.....	5%
Assessment and evaluation of student progress .....	5%

## Instructional Materials

CISCO Course Booklet / Lab Manual, one lab PC per student, one lab PC for two students for the hands-on lab activities. Connectivity to a local network and the internet.  The student lab PCs will be in various states of assembly and repair during the course and therefore are not suitable for viewing the curriculum content.
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## Instructional Module/Unit Networking for Home and Small Businesses

<b>Unit 1</b>	<b>Give an overview of field, remote, and bench technician jobs</b>	<b>Theory Hrs.</b>	<b>10</b>	<b>Lab Hrs.</b>	<b>30</b>
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### Description:

#### 1.0 Unit Introduction

- 1.1 Explain safe lab procedures and tool use
  - 1.1.1 Review safe working environments and procedures
  - 1.1.2 Review names, purposes, characteristics, and safe and appropriate use of tools
  - 1.2.1.3 Identify potential safety hazards and implement proper safety procedures for computer components
  - 1.1.4 Describe environmental issues
- 1.2 Describe situations requiring replacement of computer components
  - 1.2.4 Select a case and power supply
  - 1.2.2 Select a motherboard
  - 1.2.3 Select the CPU and heat sink/fan assembly
  - 1.2.4 Select RAM
  - 1.2.5 Select adapter cards
  - 1.2.6 Select storage devices and hard drives
  - 1.2.7 Select input and output devices
- 1.3 Upgrade and configure personal computer components and peripherals
  - 1.3.1 Upgrade and configure a motherboard
  - 1.3.2 Upgrade and configure a CPU and a heat sink/fan assembly
  - 1.3.3 Upgrade and configure RAM
  - 1.3.4 Upgrade and configure BIOS
  - 1.3.5 Upgrade and configure storage devices and hard drives
  - 1.3.6 Upgrade and configure input and output devices
- 1.4 Identify and apply common preventive maintenance techniques for personal computer components
  - 1.4.1 Clean internal components
  - 1.4.2 Clean the case
  - 1.4.3 Inspect computer components
- 1.5 Troubleshoot computer components and peripherals
  - 1.5.1 Review the troubleshooting process
  - 1.5.2 Identify common problems and solutions
  - 1.5.3 Apply troubleshooting skills

#### 1.6 Unit Summary

<b>Anchor Standards:</b>	<b>Pathway Standards:</b>	<b>Academic Standards:</b>
2.1-2.4, 2.7, 4.1-4.3, 5.1-5.4, 5.5, 5.6, 6.3, 6.4-6.9, 7.4, 7.7, 8.1, 8.2, 8.3, 10.1-10.3, 10.5, 10.6, 10.8, 10.9, 10.10, 10.11-10.14, 11.1, 11.2	A1.1, A2.1-2.4, A3.1, A3.2, A3.3-3.5, A4.1, A4.2, A6.1-A6.7, A7.3, A8.3, A8.5	LS 11-12.1, 11-12.2, 11-12.3, 11-12.4, 11-12.6, RSIT 11-12.1-12.3, RSIT 11-12.7, WS 11-12.1m 11-12.2, 11-12.5, 11-12.6 A-CED 1-3, A-REI 1, 2, N-RN 1, 2, N-Q 1-3, N-VM 6-12, S-IC 1-2, 3, 5, 6, S-ID 1-6, S-MD 1-7, APPS 10-16,

		LSIA, LSI.B, LS4.B, AD 12.7-12.8.3, US 11.8-11.8.7, WH 10.3-10.3.5, 10.9, 10.11
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<b>Unit 2</b>	<b>Select the appropriate operating system based on customer needs</b>	<b>Theory Hrs.</b>	<b>15</b>	<b>Lab Hrs.</b>	<b>20</b>
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**Description:**

2.0 Unit Introduction

2.1 Describe operating systems

2.1.1 Describe network operating systems

2.1.2 Windows OS directory structures

2.2 Install, configure, and optimize an operating system

2.2.1 Compare and contrast a default installation and a custom installation

2.2.2 Install Windows XP using a custom installation

2.2.3 Create, view, and manage disks, directories, and files

2.2.4 Identify procedures and utilities used to optimize the performance of operating systems

2.2.5 Identify procedures and utilities used to optimize the performance of browsers

2.2.6 Describe installation, use, and configuration of email software

2.2.7 Set screen resolution and update video driver

2.2.8 Describe installation of a second operating system

2.2.9 Windows CLI commands

2.3 Describe how to upgrade operating systems

2.4 Describe preventive maintenance procedures for operating systems

2.4.1 Schedule automatic tasks and updates

2.4.2 Set restores points

2.5 Troubleshoot operating systems

2.5.1 Review the troubleshooting process

2.5.2 Identify common problems and solutions

2.5.3 Apply troubleshooting skills

2.6 Unit Summary

<b>Anchor Standards:</b>	<b>Pathway Standards:</b>	<b>Academic Standards:</b>
2.1-2.4, 2.7, 4.1-4.3, 5.1-5.4, 5.5, 5.6, 6.3, 6.4-6.9, 7.4, 7.7, 8.1, 8.2, 8.3, 10.1-10.3, 10.5, 10.6, 10.8, 10.9, 10.10, 10.11-10.14, 11.1, 11.2	A1.1, A2.1-2.4, A3.1, A3.2, A3.3-3.5, A4.1, A4.2, A6.1-A6.7, A7.3, A8.3, A8.5	LS 11-12.1, 11-12.2, 11-12.3, 11-12.4, 11-12.6, RSIT 11-12.1-12.3, RSIT 11-12.7, WS 11-12.1m 11-12.2, 11-12.5, 11-12.6 A-CED 1-3, A-REI 1, 2, N-RN 1, 2, N-Q 1-3, N-VM 6-12, S-IC 1-2, 3, 5, 6, S-ID 1-6, S-MD 1-7, APPS 10-16, LSIA, LSI.B, LS4.B, AD 12.7-12.8.3, US 11.8-11.8.7, WH 10.3-10.3.5, 10.9, 10.11

<b>Unit 3</b>	<b>Describe Wireless communication methods for laptops and portable devices</b>	<b>Theory Hrs.</b>	<b>10</b>	<b>Lab Hrs.</b>	<b>30</b>
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**Description:**

3.0 Unit Introduction

3.1 Describe Bluetooth technology

3.1.1 Describe infrared technology

3.1.2 Describe cellular WAN technology

3.1.3 Describe Wi-Fi technology

3.1.4 Describe satellite technology

3.2 Describe repairs for laptops and portable devices

3.3 Select laptop components

3.3.1 Select batteries

3.3.2 Select a docking station or port replicator

3.3.3 Select storage devices

3.3.4 Select additional RAM

3.4 Describe preventive maintenance procedures for laptops

3.4.1 Describe how to schedule and perform maintenance for laptops

3.4.2 Explain how to manage data version control between desktops and laptops

3.5 Describe how to troubleshoot a laptop

3.5.1 Review the troubleshooting process

3.5.2 Identify common problems and solutions

3.5.3 Apply troubleshooting skills

3.6 Unit Summary

<b>Anchor Standards:</b>	<b>Pathway Standards:</b>	<b>Academic Standards:</b>
22.1-2.4, 2.7, 4.1-4.3, 5.1-5.4, 5.5, 5.6, 6.3, 6.4-6.9, 7.4, 7.7, 8.1, 8.2, 8.3, 10.1-10.3, 10.5, 10.6, 10.8, 10.9, 10.10, 10.11-10.14, 11.1, 11.2	A1.1, A2.1-2.4, A3.1, A3.2, A3.3-3.5, A4.1, A4.2, A6.1-A6.7, A7.3, A8.3, A8.5	LS 11-12.1, 11-12.2, 11-12.3, 11-12.4, 11-12.6, RSIT 11-12.1-12.3, RSIT 11-12.7, WS 11-12.1m 11-12.2, 11-12.5, 11-12.6 A-CED 1-3, A-REI 1, 2, N-RN 1, 2, N-Q 1-3, N-VM 6-12, S-IC 1-2, 3, 5, 6, S-ID 1-6, S-MD 1-7, APPS 10-16, LSI.A, LSI.B, LS4.B, AD 12.7-12.8.3, US 11.8-11.8.7, WH 10.3-10.3.5, 10.9, 10.11

<b>Unit 4</b>	<b>Describe potential safety hazards and safety procedures associated with printers and scanners</b>	<b>Theory Hrs.</b>	<b>15</b>	<b>Lab Hrs.</b>	<b>30</b>
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**Description:**

4.0 Unit Introduction

4.1 Install and configure a local printer and scanner

4.1.1 Connect the device to a local port

4.1.2 Install and configure the driver and software

4.1.3 Configure options and default settings

4.1.4 Verify functionality

4.2 Describe how to share a printer and scanner on a network

4.2.1 Describe types of print servers

4.2.2 Describe how to install network printer software and drivers on a computer

4.3 Upgrade and configure printers and scanners

4.3.1 Describe printer upgrades

4.3.2 Describe scanner optimization

4.4 Describe printer and scanner preventive maintenance techniques

4.4.1 Determine scheduled maintenance according to vendor guidelines

4.4.2 Describe a suitable environment for printers and scanners

4.4.3 Describe cleaning methods

4.4.4 Describe checking capacity of ink cartridges and toners

4.5 Troubleshoot printers and scanners

4.5.1 Review the troubleshooting process

4.5.2 Identify common problems and solutions

4.5.3 Apply troubleshooting skills

4.6 Unit Summary

<b>Anchor Standards:</b>	<b>Pathway Standards:</b>	<b>Academic Standards:</b>
2.1-2.4, 2.7, 4.1-4.3, 5.1-5.4, 5.5, 5.6, 6.3, 6.4-6.9, 7.4, 7.7, 8.1, 8.2, 8.3, 10.1-10.3, 10.5, 10.6, 10.8, 10.9, 10.10, 10.11-10.14, 11.1, 11.2	A1.1, A2.1-2.4, A3.1, A3.2, A3.3-3.5, A4.1, A4.2, A6.1-A6.7, A7.3, A8.3, A8.5	LS 11-12.1, 11-12.2, 11-12.3, 11-12.4, 11-12.6, RSIT 11-12.1-12.3, RSIT 11-12.7, WS 11-12.1m 11-12.2, 11-12.5, 11-12.6 A-CED 1-3, A-REI 1, 2, N-RN 1, 2, N-Q 1-3, N-VM 6-12, S-IC 1-2, 3, 5, 6, S-ID 1-6, S-MD 1-7, APPS 10-16, LSI.A, LSI.B, LS4.B, AD 12.7-12.8.3, US 11.8-11.8.7, WH 10.3-10.3.5, 10.9, 10.11

<b>Unit 5</b>	<b>Identify potential safety hazards and implement proper safety procedures related to networks</b>	<b>Theory Hrs.</b>	<b>15</b>	<b>Lab Hrs.</b>	<b>20</b>
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**Description:**

5.0 Unit Introduction

5.1 Explain fiber-optic safety.

5.1.1 Explain cable, cable cutters, and cable cutting safety hazards

5.2 Design a network based on the customer's needs

5.2.1 Determine a topology

5.2.2 Determine protocols and network applications

5.3 Determine the components for your customer's network

5.3.1 Select cable types

5.3.2 Select an ISP connection type

5.3.3 Select network cards

5.3.4 Select the network device

5.4 Implement the customer's network

5.4.1 Install and test the customer's network

5.4.2 Configure the customer's Internet and network resources

5.5 Upgrade the customer's network

5.5.1 Install and configure a wireless NIC

5.5.2 Install and configure a wireless router

5.5.3 Test a connection

5.6 Describe installation, configuration, and management of a simple mail server

5.7 Describe preventive maintenance procedures for networks

5.8 Troubleshoot the network

5.8.1 Review the troubleshooting process

5.8.2 Identify common problems and solutions

5.8.3 Apply troubleshooting skills

5.9 Unit Summary

<b>Anchor Standards:</b>	<b>Pathway Standards:</b>	<b>Academic Standards:</b>
2.1-2.4, 2.7, 4.1-4.3, 5.1-5.4, 5.5, 5.6, 6.3, 6.4-6.9, 7.4, 7.7, 8.1, 8.2, 8.3, 10.1-10.3, 10.5, 10.6, 10.8, 10.9, 10.10, 10.11-10.14, 11.1, 11.2	A1.1, A2.1-2.4, A3.1, A3.2, A3.3-3.5, A4.1, A4.2, A6.1-A6.7, A7.3, A8.3, A8.5	LS 11-12.1, 11-12.2, 11-12.3, 11-12.4, 11-12.6, RSIT 11-12.1-12.3, RSIT 11-12.7, WS 11-12.1m 11-12.2, 11-12.5, 11-12.6 A-CED 1-3, A-REI 1, 2, N-RN 1, 2, N-Q 1-3, N-VM 6-12, S-IC 1-2, 3, 5, 6, S-ID 1-6, S-MD 1-7, APPS 10-16, LSI.A, LSI.B, LS4.B, AD 12.7-12.8.3, US 11.8-11.8.7, WH 10.3-10.3.5, 10.9, 10.11



<b>Unit 6</b>	<b>Outline security requirements based on customer needs</b>	<b>Theory Hrs.</b>	<b>15</b>	<b>Lab Hrs.</b>	<b>30</b>
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**Description:**

6.0 Unit Introduction

6.1 Outline a local security policy

- 6.1.1 Explain when and how to use security hardware
- 6.1.2 Explain when and how to use security application software

6.2 Select security components based on customer needs

- 6.2.1 Describe and compare security techniques
- 6.2.2 Describe and compare access control devices
- 6.2.3 Describe and compare firewall types

6.3 Implement customer's security policy

- 6.3.1 Configure security settings
- 6.3.2 Describe configuring firewall types
- 6.3.3 Describe protection against malicious software

6.4 Perform preventive maintenance on security

- 6.4.1 Describe the configuration of operating system updates
- 6.4.2 Maintain accounts
- 6.4.3 Explain data backup procedures, access to backups, and securing physical backup media

6.5 Troubleshoot security

- 6.5.1 Review the troubleshooting process
- 6.5.2 Identify common problems and solutions
- 6.5.3 Apply troubleshooting skills

6.6 Unit Summary

<b>Anchor Standards:</b>	<b>Pathway Standards:</b>	<b>Academic Standards:</b>
2.1-2.4, 2.7, 4.1-4.3, 5.1-5.4, 5.5, 5.6, 6.3, 6.4-6.9, 7.4, 7.7, 8.1, 8.2, 8.3, 10.1-10.3, 10.5, 10.6, 10.8, 10.9, 10.10, 10.11-10.14, 11.1, 11.2	A1.1, A2.1-2.4, A3.1, A3.2, A3.3-3.5, A4.1, A4.2, A6.1-A6.7, A7.3, A8.3, A8.5	LS 11-12.1, 11-12.2, 11-12.3, 11-12.4, 11-12.6, RSIT 11-12.1-12.3, RSIT 11-12.7, WS 11-12.1m 11-12.2, 11-12.5, 11-12.6 A-CED 1-3, A-REI 1, 2, N-RN 1, 2, N-Q 1-3, N-VM 6-12, S-IC 1-2, 3, 5, 6, S-ID 1-6, S-MD 1-7, APPS 10-16, LSI.A, LSI.B, LS4.B, AD 12.7-12.8.3, US 11.8-11.8.7, WH 10.3-10.3.5, 10.9, 10.11

<b>Totals</b>	<b>Theory Hrs.</b>	<b>80</b>	<b>Lab Hrs.</b>	<b>160</b>	<b>Total Hrs.</b>	<b>240</b>
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## APPENDIX A:

### MATRIX FOR ALL ASPECTS OF THE INDUSTRY

All Aspects of the Industry is a key element of the Carl D. Perkins Vocational and Applied Technology Education Act and the School-to Work Opportunities Act. Both acts emphasize giving students a comprehensive perspective and range of skills across an industry. The Perkins Act requires programs to “provide students with strong experience in and understanding of all aspects of the industry students are preparing to enter”. The Act identifies eight aspects in particular, which are common to any business or industry. Programs receiving Perkins funds are required to include the teaching of these concepts to provide students with the skills necessary to be successful in their employment.

#### STRATEGIES

Below is a matrix showing the components of “All Aspects of the Industry for the *name of Course.*” A list of strategies is provided for each component.

ASPECTS	SEQUENCE OF COURSES	
	<b>Course 1:</b> <b>A+ Computer Repair: Essentials &amp; Practical Application</b>	<b>Course 2:</b> <b>A+ Computer Repair: Essentials &amp; Practical Application DL</b>
<b>Planning</b>	Students are exposed to an overview of the business types and the importance of their planning in the IT industry. Various forms of ownership and the impact that their planning and success has on the economic, political and social conscience is discussed.	Students are familiar with the business types and the importance of their planning in the IT industry. They also have an understanding of the various forms of ownership and the impact that their planning and success has on the economic, political and social conscience is discussed.
<b>Management</b>	Students are exposed to an overview of the management methods used to manage enterprises over time within the industry. Students learn how workers’ jobs are diversified and expanded, and the methods used to broaden worker involvement in the decision-making process.	Students are aware of the management methods used to manage enterprises over time within the industry. Students understand how workers’ jobs are diversified and expanded, and the methods used to broaden worker involvement in the decision-making process.
<b>Finance</b>	Students are exposed to an overview of basic accounting and financial decisions that are made in the IT industry for: New startup business, rising capital and expanding existing ventures. Students are exposed to the paper trail that’s required and used by many businesses such as work orders, invoices and time keeping reports.	Students understand the accounting and financial decisions that are made in the IT industry for: New startup business, rising capital and expanding existing ventures. Students also understand the paperwork that is used by many businesses such as work orders, invoices and time keeping reports.
<b>Technical &amp; Production Skills</b>	Students are exposed to an overview of specific techniques used by Computer technicians; also, how to organize work load and cross training strategies for workers.	Students are aware of specific techniques used by Computer technicians; also, how to organize work load and cross training strategies for workers.

#### A+ COMPUTER REPAIR: Essential & Practical Application

<b>Underlying Principles Of Technology</b>	Students are exposed to an overview of the underlying principles that support our curriculum and industry such as the Mathematical, Scientific, Social and Economic principles that underlie the technology.	Students are aware of the underlying principles that support our curriculum and industry such as the Mathematical, Scientific, Social and Economic principles that underlie the technology.
<b>Labor Issues</b>	Students are exposed to an overview of labor issues, such as workers' rights, labor unions, labor history and methods used for expanding the worker's role.	Students are aware of labor issues, such as workers' rights, labor unions, labor history and methods used for expanding the worker's role.
<b>Community Issues</b>	Students are exposed to an overview of the involvement and impact of the industry on the community and the impact of the community on the industry.	Students are aware of the involvement and impact of the industry on the community and the impact of the community on the industry.
<b>Health, Safety, &amp; Environmental Issues</b>	Students are exposed to an overview of the Health, Safety, and Environmental issues of the industry as they relate to the workers, the community and the environment.	Students are aware of the Health, Safety, and Environmental issues of the industry as they relate to the workers, the community and the environment.